In claim 40, line 1, kindly replace "any of claims 1-24" with --claim 1--.

In claim 41, line 1, kindly replace "any of claims 1-24" with --claim 1--.

In claim 42, line 1, kindly replace "any of claims 1-24" with --claim 1--.

In claim 43, line 1, kindly replace "any of claims 1-24" with --claim 1--.

In claim 44, line 1, kindly replace "any of claims 1-24" with --claim 1--.

In claim 73, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 80, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 81, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 83, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 86, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 90, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 91, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 92, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 93, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 94, line 1, kindly replace "any of claims 49-72" with --claim 71--.

In claim 99, line 1, kindly replace "any of claims 49-72" with --claim 71--.

Kindly add the following new claims:

--100. Apparatus according to claim 16, wherein application of the extended pacing signal modifies a characteristic of pulsatile flow of blood in the heart.

101. Apparatus according to claim 100, wherein the application of the extended pacing signal increases a stroke volume of the heart by at least 5% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

102. Apparatus according to claim 101, wherein the application of the extended pacing signal increases the stroke volume by at least 10% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

103. Apparatus according to claim 100, wherein the application of the extended pacing signal modifies a cardiac output of the heart by at least 5% relative to the cardiac output when the heart is paced with pulses less than 2 ms in duration at a pacing rate equal to that of the extended pacing signal.

104. Apparatus according to claim 100, wherein the application of the extended pacing signal increases a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

105. Apparatus according to claim 100, wherein the application of the extended pacing signal decreases a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

106. Apparatus according to claim 100, wherein the application of the extended pacing signal modifies a muscular tension in the heart by at least 10% relative to

the tension when the heart is paced with pulses less than 2 ms in duration.

107. Apparatus according to claim 16, wherein application of the extended pacing signal modifies the duration of an action potential in the respective cardiac muscle segments by at least 10% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

108. Apparatus according to claim 16, wherein the signal generation circuitry comprises a pulse generator and a DC offset generator, whose outputs are summed to provide the extended pacing signal.

109. Apparatus according to claim 16, wherein the one or more electrodes comprise a plurality of electrodes, which are positioned in different chambers of the heart.

110. Apparatus according to claim 109, wherein the signal comprises a plurality of waveforms, which are applied respectively to the electrodes in the different chambers according to a predetermined time sequence.

111. Apparatus according to claim 109, wherein a pacing pulse having a duration less than 8 ms is applied to one or more of the electrodes positioned in a first one of the different chambers, and wherein the extended pacing signal is applied to another one or more of the electrodes positioned in a second one of the different chambers.

112. Apparatus according to claim 16, wherein the signal generation circuitry applies the extended pacing signal to the one or more electrodes in response to a demand for an enhancement of hemodynamic performance of the heart.

113. Apparatus according to claim 112, wherein the enhancement of hemodynamic performance comprises an increase in cardiac output.

114. Apparatus according to claim 112, and comprising a sensor which generates an output responsive to a physiological parameter indicative of the demand for the enhancement, wherein the signal generation circuitry applies the extended pacing signal responsive to the output from the sensor.

115. Apparatus according to claim 112, wherein in the absence of the demand for the enhancement, the signal generation circuitry applies pacing pulses to the electrodes of substantially lower energy than the extended pacing signal.

116. Apparatus according to claim 16, wherein the one or more electrodes comprise endocardial electrodes.

117. Apparatus according to claim 16, wherein the one or more electrodes comprise epicardial electrodes.

118. Apparatus according to claim 16, wherein the one or more electrodes comprise transmyocardial electrodes.

119. Apparatus according to claim 16, wherein the one or more electrodes comprise transvenous electrodes.

120. Apparatus according to claim 16, and comprising a sensor, coupled to generate a signal responsive to activity of the heart, wherein the signal generation circuitry receives the signal from the sensor and modifies the extended pacing signal responsive thereto.

121. Apparatus according to claim 120, wherein the sensor comprises an electrode.

122. Apparatus according to claim 121, wherein the electrode senses a Monophasic Action Potential signal.

123. Apparatus according to claim 121, wherein the sensor comprises a pair of closely-spaced bipolar electrodes, which sense a local endocardial action potential.

124. Apparatus according to claim 120, wherein the signal generation circuitry detects a possible arrhythmic

stimulation of the heart and modifies the extended pacing signal so as to prevent the arrhythmic stimulation.

125. Apparatus according to claim 23, wherein application of the extended pacing signal modifies a characteristic of pulsatile flow of blood in the heart.

126. Apparatus according to claim 125, wherein the application of the extended pacing signal increases a stroke volume of the heart by at least 5% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

127. Apparatus according to claim 126, wherein the application of the extended pacing signal increases the stroke volume by at least 10% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

128. Apparatus according to claim 125, wherein the application of the extended pacing signal modifies a cardiac output of the heart by at least 5% relative to the cardiac output when the heart is paced with pulses less than 2 ms in duration at a pacing rate equal to that of the extended pacing signal.

129. Apparatus according to claim 125, wherein the application of the extended pacing signal increases a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

130. Apparatus according to claim 125, wherein the application of the extended pacing signal decreases a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

131. Apparatus according to claim 125, wherein the application of the extended pacing signal modifies a muscular tension in the heart by at least 10% relative to

the tension when the heart is paced with pulses less than 2 ms in duration.

132. Apparatus according to claim 23, wherein application of the extended pacing signal modifies the duration of an action potential in the respective cardiac muscle segments by at least 10% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

133. Apparatus according to claim 23, wherein the signal generation circuitry comprises a pulse generator and a DC offset generator, whose outputs are summed to provide the extended pacing signal.

134. Apparatus according to claim 23, wherein the one or more electrodes comprise a plurality of electrodes, which are positioned in different chambers of the heart.

135. Apparatus according to claim 134, wherein the signal comprises a plurality of waveforms, which are applied respectively to the electrodes in the different chambers according to a predetermined time sequence.

136. Apparatus according to claim 134, wherein a pacing pulse having a duration less than 8 ms is applied to one or more of the electrodes positioned in a first one of the different chambers, and wherein the extended pacing signal is applied to another one or more of the electrodes positioned in a second one of the different chambers.

137. Apparatus according to claim 23, wherein the signal generation circuitry applies the extended pacing signal to the one or more electrodes in response to a demand for an enhancement of hemodynamic performance of the heart.

138. Apparatus according to claim 137, wherein the enhancement of hemodynamic performance comprises an increase in cardiac output.

139. Apparatus according to claim 137, and comprising a sensor which generates an output responsive to a physiological parameter indicative of the demand for the enhancement, wherein the signal generation circuitry applies the extended pacing signal responsive to the output from the sensor.

140. Apparatus according to claim 137, wherein in the absence of the demand for the enhancement, the signal generation circuitry applies pacing pulses to the electrodes of substantially lower energy than the extended pacing signal.

141. Apparatus according to claim 23, wherein the one or more electrodes comprise endocardial electrodes.

142. Apparatus according to claim 23, wherein the one or more electrodes comprise epicardial electrodes.

143. Apparatus according to claim 23, wherein the one or more electrodes comprise transmyocardial electrodes.

144. Apparatus according to claim 23, wherein the one or more electrodes comprise transvenous electrodes.

145. Apparatus according to claim 23, and comprising a sensor, coupled to generate a signal responsive to activity of the heart, wherein the signal generation circuitry receives the signal from the sensor and modifies the extended pacing signal responsive thereto.

146. Apparatus according to claim 145, wherein the sensor comprises an electrode.

147. Apparatus according to claim 146, wherein the electrode senses a Monophasic Action Potential signal.

148. Apparatus according to claim 146, wherein the sensor comprises a pair of closely-spaced bipolar electrodes, which sense a local endocardial action potential.

149. Apparatus according to claim 145, wherein the signal generation circuitry detects a possible arrhythmic

stimulation of the heart and modifies the extended pacing signal so as to prevent the arrhythmic stimulation.

150. A method according to claim 49, wherein conveying the extended pacing signal comprises modifying a characteristic of pulsatile flow of blood in the heart.

151. A method according to claim 150, modifying the characteristic comprises increasing a stroke volume of the heart by at least 5% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

152. A method according to claim 151, wherein increasing the stroke volume comprises increasing the stroke volume by at least 10% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

153. A method according to claim 150, wherein modifying the characteristic comprises modifying a cardiac output of the heart by at least 5% relative to the cardiac output when the heart is paced with pulses less than 2 ms in duration at a pacing rate equal to that of the extended pacing signal.

154. A method according to claim 150, wherein modifying the characteristic comprises increasing a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

155. A method according to claim 150, wherein modifying the characteristic comprises decreasing a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

156. A method according to claim 150, wherein modifying the characteristic comprises modifying a muscular tension in the heart by at least 10% relative to the tension when

the heart is paced with pulses less than 2 ms in duration.

157. A method according to claim 49, wherein conveying the extended pacing signal comprises modifying the duration of an action potential in the respective cardiac muscle segments by at least 10% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

158. A method according to claim 49, wherein conveying the extended pacing signal increases a muscular tension in the respective cardiac muscle segments by at least 50% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

159. A method according to claim 158, wherein conveying the extended pacing signal increases the muscular tension in the respective cardiac muscle segments by at least 100% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

160. A method according to claim 49, wherein applying the one or more electrodes comprises applying a plurality of electrodes in different chambers of the heart.

161. A method according to claim 160, wherein conveying the extended pacing signal comprises conveying a plurality of waveforms respectively to the electrodes in the different chambers according to a predetermined time sequence.

162. A method according to claim 160, and comprising conveying a pacing pulse having a duration less than 8 ms to one or more of the electrodes positioned in a first one of the different chambers, and wherein conveying the extended pacing signal comprises conveying the signal to another one or more of the electrodes positioned in a second one of the different chambers.

163. A method according to claim 49, wherein conveying the extended pacing signal comprises conveying the signal to the one or more electrodes in response to a demand for an enhancement of hemodynamic performance of the heart.

164. A method according to claim 163, wherein the enhancement of hemodynamic performance comprises an increase in cardiac output.

165. A method according to claim 163, and comprising receiving an output signal responsive to a physiological parameter indicative of the demand for the enhancement, and wherein conveying the extended pacing signal comprises conveying the pacing signal responsive to the output signal.

166. A method according to claim 163, and comprising, in the absence of the demand for the enhancement, conveying pacing pulses to the electrodes of substantially lower energy than the extended pacing signal.

167. A method according to claim 49, wherein applying the one or more electrodes comprises applying electrodes endocardially.

168. A method according to claim 49, wherein applying the one or more electrodes comprises applying electrodes epicardially.

169. A method according to claim 49, wherein applying the one or more electrodes comprises applying electrodes transmyocardially.

170. A method according to claim 49, wherein applying the one or more electrodes comprises applying electrodes transvenously.

171. A method according to claim 49, and comprising receiving an output signal responsive to activity of the heart, and wherein conveying the extended pacing signal comprises modifying the pacing signal responsive to the output signal.

172. A method according to claim 171, wherein receiving the output signal comprises receiving an electrophysiological signal.

173. A method according to claim 172, wherein the electrophysiological signal comprises a Monophasic Action Potential signal.

174. A method according to claim 172, wherein receiving the electrophysiological signal comprises placing a pair of in close mutual proximity in contact with the heart and receiving a bipolar signal from the electrodes.

175. A method according to claim 171, wherein modifying the pacing signal comprises detecting a possible arrhythmic stimulation of the heart and modifying the extended pacing signal so as to prevent the arrhythmic stimulation.

176. A method according to claim 49, wherein applying the one or more electrodes comprises applying electrodes such that conveying the extended pacing signal engenders a redistribution of cardiac muscle mass.

177. A method according to claim 64, wherein conveying the extended pacing signal comprises modifying a characteristic of pulsatile flow of blood in the heart.

178. A method according to claim 177, modifying the characteristic comprises increasing a stroke volume of the heart by at least 5% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

179. A method according to claim 178, wherein increasing the stroke volume comprises increasing the stroke volume by at least 10% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

180. A method according to claim 177, wherein modifying the characteristic comprises modifying a cardiac output of the heart by at least 5% relative to the cardiac

output when the heart is paced with pulses less than 2 ms in duration at a pacing rate equal to that of the extended pacing signal.

181. A method according to claim 177, wherein modifying the characteristic comprises increasing a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

182. A method according to claim 177, wherein modifying the characteristic comprises decreasing a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

183. A method according to claim 177, wherein modifying the characteristic comprises modifying a muscular tension in the heart by at least 10% relative to the tension when the heart is paced with pulses less than 2 ms in duration.

184. A method according to claim 64, wherein conveying the extended pacing signal comprises modifying the duration of an action potential in the respective cardiac muscle segments by at least 10% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

185. A method according to claim 64, wherein conveying the extended pacing signal increases a muscular tension in the respective cardiac muscle segments by at least 50% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

186. A method according to claim 185, wherein conveying the extended pacing signal increases the muscular tension in the respective cardiac muscle segments by at least 100% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

187. A method according to claim 64, wherein applying the one or more electrodes comprises applying a plurality of electrodes in different chambers of the heart.

188. A method according to claim 187, wherein conveying the extended pacing signal comprises conveying a plurality of waveforms respectively to the electrodes in the different chambers according to a predetermined time sequence.

189. A method according to claim 187, and comprising conveying a pacing pulse having a duration less than 8 ms to one or more of the electrodes positioned in a first one of the different chambers, and wherein conveying the extended pacing signal comprises conveying the signal to another one or more of the electrodes positioned in a second one of the different chambers.

190. A method according to claim 64, wherein conveying the extended pacing signal comprises conveying the signal to the one or more electrodes in response to a demand for an enhancement of hemodynamic performance of the heart.

191. A method according to claim 190, wherein the enhancement of hemodynamic performance comprises an increase in cardiac output.

192. A method according to claim 190, and comprising receiving an output signal responsive to a physiological parameter indicative of the demand for the enhancement, and wherein conveying the extended pacing signal comprises conveying the pacing signal responsive to the output signal.

193. A method according to claim 190, and comprising, in the absence of the demand for the enhancement, conveying pacing pulses to the electrodes of substantially lower energy than the extended pacing signal.

194. A method according to claim 64, wherein applying the one or more electrodes comprises applying electrodes endocardially.

195. A method according to claim 64, wherein applying the one or more electrodes comprises applying electrodes epicardially.

196. A method according to claim 64, wherein applying the one or more electrodes comprises applying electrodes transmyocardially.

197. A method according to claim 64, wherein applying the one or more electrodes comprises applying electrodes transvenously.

198. A method according to claim 64, and comprising receiving an output signal responsive to activity of the heart, and wherein conveying the extended pacing signal comprises modifying the pacing signal responsive to the output signal.

199. A method according to claim 198, wherein receiving the output signal comprises receiving an electrophysiological signal.

200. A method according to claim 199, wherein the electrophysiological signal comprises a Monophasic Action Potential signal.

201. A method according to claim 199, wherein receiving the electrophysiological signal comprises placing a pair of in close mutual proximity in contact with the heart and receiving a bipolar signal from the electrodes.

202. A method according to claim 198, wherein modifying the pacing signal comprises detecting a possible arrhythmic stimulation of the heart and modifying the extended pacing signal so as to prevent the arrhythmic stimulation.

203. A method according to claim 64, wherein applying the one or more electrodes comprises applying electrodes such